

REMARKS

In the patent application, claims 1-26 are pending. In the office action, claims 1, 17-19, 23, 24 and 26 are rejected, and claims 2-16, 20-22 and 25 are allowed.

Applicant has amended claims 1, 17 and 23. Claim 1 has been amended to include the limitation of combining the spread data streams into at least one code division multiple access chip-level code stream for transmission. Claim 17 has been amended to include the limitation of a summing module or summing the spread data streams into at least one code division multiple access chip-level code stream for transmission. Claim 23 has been amended to include the limitation that the transmitter has a summing device to sum the spread data streams into at least one code division multiple access chip-level code stream for transmission. The support for the amendments can be found in Figure 4. Applicant has also amended claim 25 to correct for a typographical error.

No new matter has been introduced.

A. 102(b) CLAIM REJECTION

At section 1 of the office action, claim 1 is rejected under 102(b) as being anticipated by *Kaiser* (U.S. Patent No. 6,188,717). The Examiner states that *Kaiser* discloses a CDMA communications method as claimed.

Claim 1 of the present invention

The present invention, as claimed in claim 1, is concerned with single-carrier code division multiple access communications. Claim 1 has the limitations of:

adding a plurality of prefixes to a plurality of data streams in symbol-level carrying a plurality of transmit symbols for providing a plurality of further data streams indicative of the prefix-added data streams;

spread filtering the further data streams with a plurality of spread code signals for providing a plurality of spread data streams in a plurality of code channels; and

combining the spread data streams into at least one code division multiplex access code streams for transmission.

Kaiser is irrelevant to the present invention

- 1) *Kaiser* is concerned with multi-carrier OFDM communications.
- 2) In *Kaiser*, the spread signal in chip-level is passed through an OFDM modulator (Figure 5, block 15) and
- 3) the multi-carrier modulated OFDM symbols are cyclically extended by a guard interval (Figure 5, block 16; col.6, lines 45-49).

In rejecting claim 1, the Examiner states that *Kaiser* discloses a method for use in single carrier communications (col. 5, lines 30-33). The Examiner states that *Kaiser* uses binary phase shift keying and quadrature phase shift keying and that using binary phase shift keying and quadrature phase shift keying corresponds to single carrier.

It is respectfully submitted that, phase shift keying can be used in both single-carrier communications and multi-carrier communications. Phase shift keying is only one of many steps in converting transmit symbols into a code stream for transmission. Having a data-symbol mapper 3 with BPSK or QPSK in a channel encoder (Figure 2) does not indicate that the channel encoder is a single-carrier encoder. In fact, in the channel encoder as shown in Figure 2, *Kaiser* uses a frequency and time interleaver 5 to scramble the chips of transmission sequences in the frequency and time direction using a plurality of multi-carrier modulated OFDM symbols in order to avoid large error bursts (col. 5, lines 58-65). *Kaiser* also uses a frequency mapper and multi-carrier modulator 6 to distribute the sub-carriers of a subscriber station over the entire transmission-frequency band for increasing the diversity gain through spreading in a receiver, such that the spacing between adjacent sub-carriers of a subscriber station is equidistant and pseudo-randomly selected. The spacing between adjacent sub-carriers of a subscriber station must be a multiple factor of the reciprocal value of the duration of a multi-carrier modulated symbol to ensure orthogonality between the sub-carriers of a subscriber station and that of all subscriber stations (col. 6, lines 28 – 38).

Kaiser combines multi-carrier modulation with the spread spectrum technique so that a very large number of active subscriber stations can transmit on the available radio channel

(Abstract; col. 3, lines 30-48). In particular, *Kaiser* uses a plurality of multi-carrier-modulated orthogonal frequency division multiplex (OFDM) symbols to avoid large error bursts (col.5, lines 58 – 65; col.8, lines 11-26; lines 40-43).

In sum, although *Kaiser* uses various phase shift keying, *Kaiser* is only concerned with a multi-carrier OFDM system and method. *Kaiser* does not disclose or suggest a single-carrier CDMA system.

As admitted by the Examiner, *Kaiser* uses a method where multi-carrier modulated OFDM symbols are cyclically extended by a guard interval (Figure 5, block 16; col.6, lines 45-49). As such, the CP is added in the time-domain. This means that CP is not added in symbol-level.

For the above reasons, *Kaiser* is irrelevant to the present invention. Applicant respectfully requests that the Examiner withdraw the 102(b) rejection.

B. 103(a) CLAIM REJECTION

At section 2, claims 17-19, 23, 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Larsson* (U.S. Patent No. 6,842,487), in view of *Kaiser*.

Claim 17 of the present invention

Claim 17 is concerned with a transmitter for use in single-carrier code division multiple access communications. The transmitter has the following limitations:

a plurality of first modules, for adding a plurality of prefixes to a plurality of data streams in symbol-level carrying a plurality of transmit symbols for providing a plurality of further data streams indicative of the prefix-added data streams;

a plurality of second modules, responsive to the further data streams, for spread filtering the prefix-added data streams by a plurality of spread code signals and

a summing module for summing the spread data streams into at least one code division multiple access chip-level code stream for transmission.

Larsson is irrelevant to the present invention

- 1) *Larsson* discloses an OFDM communications system.
- 2) In *Larsson*, prefixes are added (step 1230 of Figure 12) after the received symbols are converted from the frequency domain to the time domain (step 1210). The symbols are then transmitted (step 1235). No spreading is carried out in such a multi-carrier system.

Kaiser is irrelevant to the present invention

- 1) *Kaiser* is concerned with multi-carrier OFDM communications.
- 2) In *Kaiser*, the spread signal in chip-level is passed through an OFMA modulator (Figure 5, block 15) and
- 3) the multi-carrier modulated OFDM symbols are cyclically extended by a guard interval (Figure 5, block 16; col.6, lines 45-49).

Larsson in view of Kaiser does not render claim 17 obvious

In rejecting claim 17, the Examiner states that *Larsson* discloses a plurality of first modules for adding a plurality of prefixes to the data stream in symbol-level for providing a plurality of prefix-added data streams (column 7, lines 7-11; Figure 9), and a plurality of second modules for filtering the prefix-added data streams by a plurality of code signals prior to the summing process (column 7, lines 7-21; column 8, lines 44-52; Figure 9 and 1230 of Figure 12). The Examiner further states that the claimed chip-level is inherent in orthogonal frequency division multiplexing (column 6, lines 39-41). The Examiner admits that *Larsson* fails to disclose single-carrier and spreading, but points to *Kaiser* for disclosing single-carrier and spreading. Again, the Examiner alleges that *Kaiser* discloses a single-carrier communications method.

As discussed in Section A above, phase shift keying can be used in both single-carrier communications and multi-carrier communications. Phase shift keying is only one of many steps in converting transmit symbols into a code stream for transmission. Having a data-symbol mapper 3 with BPSK or QPSK in a channel encoder (Figure 2) does not indicate that the channel encoder is a single-carrier encoder. In fact, in the channel encoder as shown in Figure 2, *Kaiser* uses a frequency and time interleaver 5 to scramble the chips of transmission sequences in the

frequency and time direction using a plurality of multi-carrier modulated OFDM symbols in order to avoid large error bursts (col. 5, lines 58-65).

Furthermore, *Larsson* discloses an orthogonal frequency division multiplex system, whereas the claimed invention is concerned with a code division multiplex access system. As shown in Figure 12, *Larsson* converts the received symbols to be transmitted from frequency domain to time domain at step 1210. *Larsson* adds the cyclic prefix at step 1230. Thus, *Larsson* adds the cyclic prefixes to the symbols in the time domain, and not in the symbol-level.

For the above reasons, *Larsson* is irrelevant to the claimed invention.

Kaiser also discloses an orthogonal frequency divisional multiplex system. *Kaiser* also adds the cyclic prefixes in the time domain. Even when a person skilled in art combines the teachings in *Larsson* and *Kaiser*, the combined teachings are still concerned with an orthogonal frequency divisional multiplex system, wherein the cyclic prefixes are added in the time domain.

In sum, *Larsson*, in view of *Kaiser*, does not disclose or suggest:

a plurality of first modules, for adding a plurality of prefixes to a plurality of data streams in symbol-level carrying a plurality of transmit symbols for providing a plurality of further data streams indicative of the prefix-added data streams; and

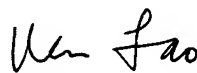
a summing module for summing the spread data streams into at least one code division multiple access chip-level code stream for transmission.

Applicant respectfully requests that the Examiner withdraw the 103(a) rejection of claims 17 and 23.

As for claims 18, 19, 24 and 26, they are dependent from claims 17 and 23 and recite features not recited in claims 17 and 23. For reasons regarding claims 17 and 23 above, claims 18, 19, 24 and 26 are also distinguishable over the cited *Larsson* and *Kaiser* references.

CONCLUSION

Claims 2-16, 20-22 and 25 have been allowed. As amended, claims 1, 17-19, 23, 24 and 26 are allowable. Early allowance of all pending claims is earnestly solicited.

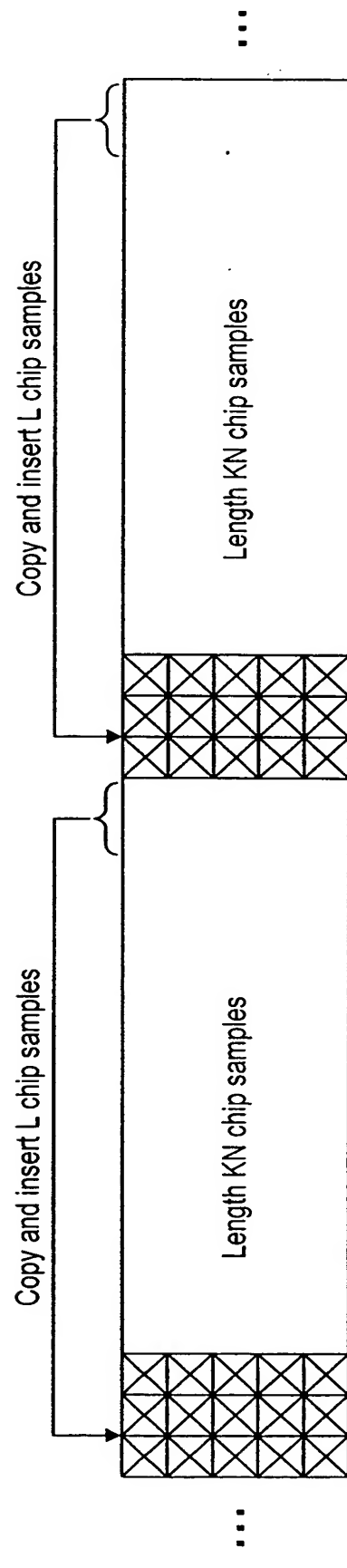
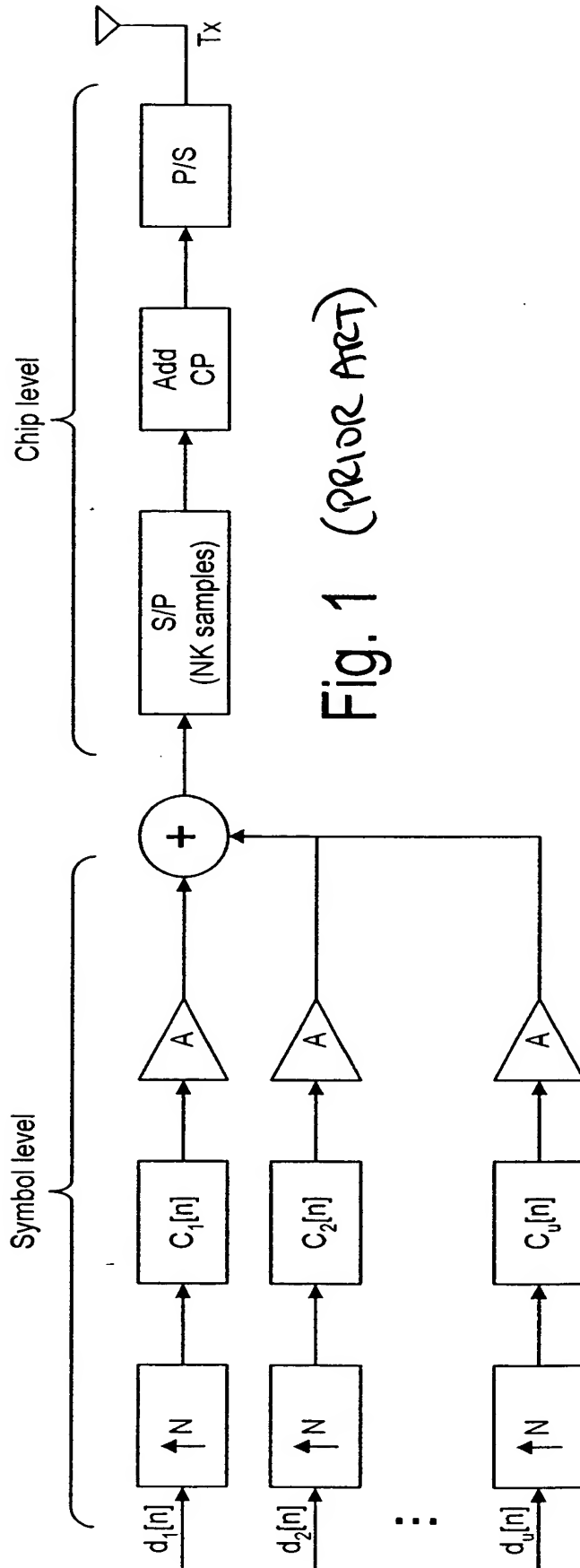


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In the Drawings

Please replace the drawing sheet for Figure 1 and Figure 2 and the drawing sheet for Figure 3 and Figure 7 with attached corresponding replacement sheets.



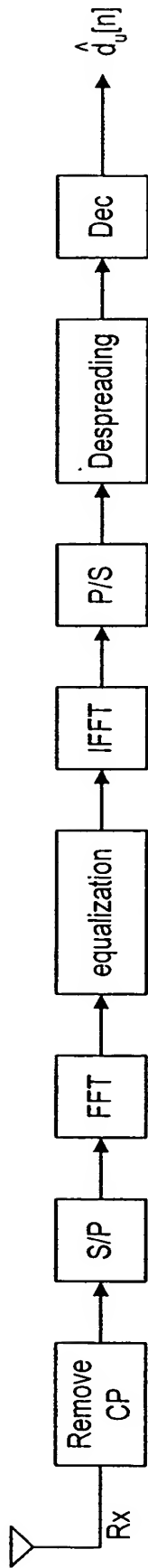


Fig. 3 (REVISED)

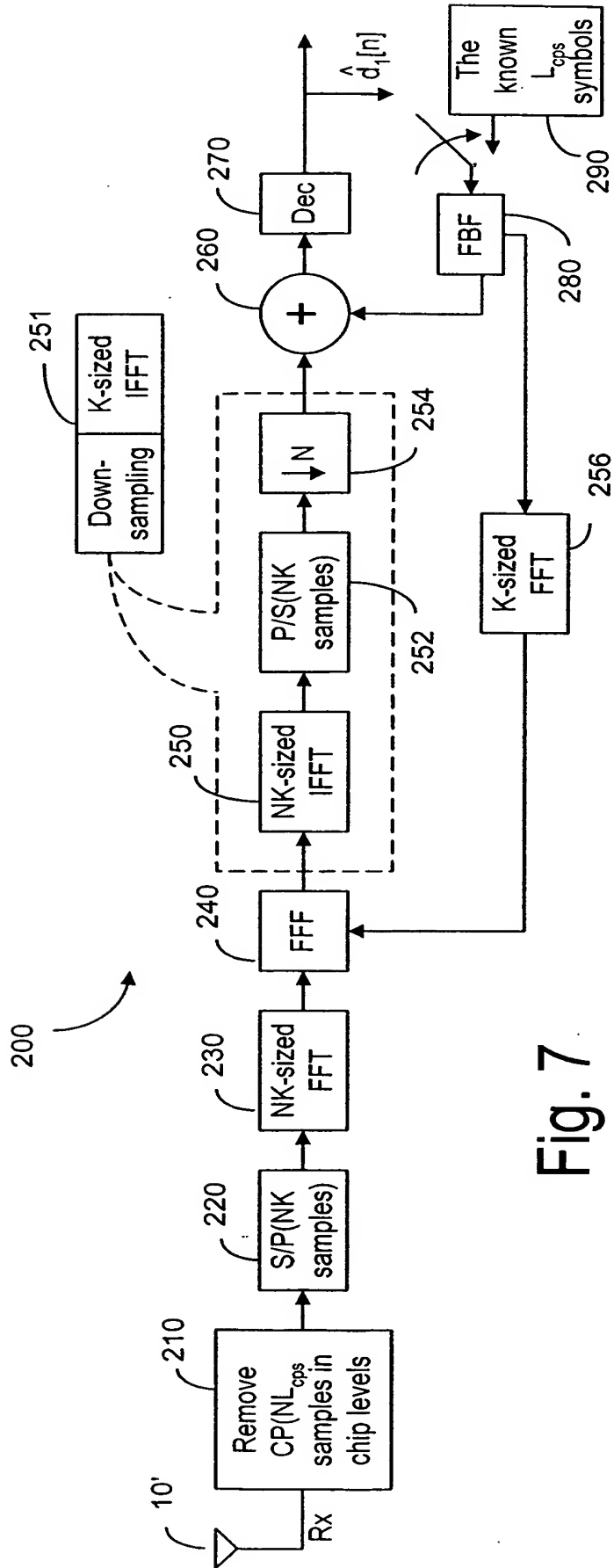


Fig. 7